Canadian Space Agency

2018–19

Departmental Plan

The Honourable Navdeep Bains, P.C., M.P.
Minister of Innovation, Science and Economic Development

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Minister's message

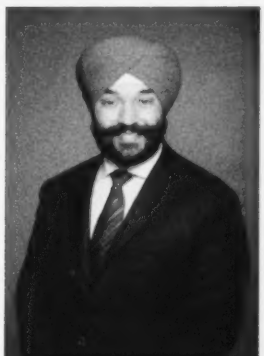
The work of the Innovation, Science and Economic Development Portfolio is as diverse as it is expansive. We are involved in many important areas of our economy, including: making critical investments in innovation and science; supporting the commercialization of research and ideas; providing Canadians with the skills to excel in the digital economy; helping small businesses grow; promoting Canada as a world-leading tourism destination; and integrating science into our investment and policy decisions.

2018–19 will be an exciting year for all of this important work as we seek to make Canada a global innovation leader. We are continuing to implement the next steps of the Innovation and Skills Plan, which will build an economy that works for everyone. Through Budget 2018, we are making the single-largest investment in science in Canadian history to ensure that Canada remains a world leader in research and commercialization. And we are delivering Canada's first Women Entrepreneurship Strategy, to support women entrepreneurs as they start, grow and scale their businesses.

We believe our economy should work for all Canadians. We want to see Canadian businesses, large and small, create high-quality jobs, and we want them to compete in the knowledge economy, driven by creative, boundary-pushing ideas.

The CSA will focus on using space to drive economic growth, support talent, and develop technologies while promoting science and stimulating new investment in companies to leverage the benefits of space for Canadians.

It is my pleasure to present the 2018–19 Departmental Plan for the Canadian Space Agency.



The Honourable Navdeep Bains
Minister of Innovation, Science and Economic Development

Plans at a glance

In 2018–19, the Canadian Space Agency's (CSA) key priorities are aligned with its departmental results framework and program inventory. These priorities enable the CSA to make progress on achieving its mandate, as well as Government of Canada commitments to and for Canadians. Each of these priorities align with the mandate letter of the Minister of Innovation, Science and Economic Development,[i] which states that the minister's overarching goal is to help Canadian businesses grow, innovate and export. They are also fully aligned with the three pillars of the Innovation and Skills Plan[ii]—People, Technologies and Companies.

Priority 1 – Launch of the RADARSAT Constellation Mission (RCM)

Space-based imagery is essential to the safety, security and well-being of Canadians ranging from disaster response to precision farming and from tracking vessels in and approaching Canadian waters to climate change monitoring. The three-satellite configuration of RCM,[iii] which is scheduled to launch in the second half of the 2018–19 fiscal year, will provide multiple daily captures of Canada's vast territory and vessel traffic near our borders, as well as the capability to observe 90% of the world's surface, thus ensuring the ongoing provision of high-quality space-based radar data to support government departments and agencies in delivering on their mandates.

In 2018–19, the CSA aims to provide 11 Government of Canada (GoC) department and agencies with Earth Observation data or derived information which will then be used to provide various types of services to Canadians.

This priority is also aligned with the Minister of Science's mandate letter to enable government departments and agencies to make informed decisions.

Priority 2 – CSA astronaut David Saint-Jacques's flight to the International Space Station

Canadian astronaut David Saint-Jacques[iv] will be launched aboard a Soyuz spacecraft to the International Space Station (ISS) for a six-month mission in November 2018. In addition to the science experiments conducted by David Saint-Jacques on the ISS, this mission will be a great opportunity to showcase Canadian medical technologies that have been developed for space exploration and have a potential for use on Earth.

The CSA will also take advantage of the interest in David Saint-Jacques' flight to invite young Canadians to visit exhibits throughout the country and engage in science, technology, engineering, mathematics (STEM) activities. It is expected that over 1 million Canadians will engage with the CSA in 2018–19.

This priority also supports the mandate letter of the Minister of Science, which states that the minister's overarching goal is to support scientific research and innovation.

Priority 3 – Implementation of the CubeSat project

In 2018–19, the CSA will provide faculty members in Canadian post-secondary institutions and their students with an opportunity to participate in a CubeSat mission.[v] A CubeSat is a square-shaped miniature satellite roughly twice the size of a Rubik's cube, weighing about 1 kg. This unique, hands-on experience will enable students to acquire expertise in a wide variety of areas, ranging from science, to engineering, to communicating their work to the public while providing them with the opportunity to develop invaluable skills for when they transition into the workforce in the global innovation economy.

Priority 4 – Continuous Improvement Agenda

While the CSA's mandate is to ensure that investments in space benefit Canadians, it is also imperative that the CSA continue to build a modern workplace and a culture of continuous improvement in the spirit of the guiding principles of Blueprint 2020.[vi] The CSA's Health and Wellness Strategy aims to provide a work environment that promotes health, psychological safety and working conditions conducive to wellness and vitality, which are key in achieving well-being and a productive workforce.

For more information on the CSA's plans, priorities and planned results, see the "Planned Results" section of this report.

Planned results: what we want to achieve this year and beyond

Core Responsibility

Canada in space

Description

The CSA coordinates the space policies and programs of the government of Canada; ensures that other government departments and agencies have access to space data, information, and services to deliver on their mandate; plans, directs and manages projects relating to scientific or industrial space research and the development of space science and technology; promotes the transfer and diffusion of space technology to and throughout the Canadian industry; and encourages the commercial exploitation of the space capabilities, technology, facilities and systems. The CSA also aims to build Canada's capacity and engage the next generation of space scientists and engineers and provide opportunities to inspire young people to develop the required skills and to pursue studies and careers in science, technology, engineering and math.

Planning highlights

A thriving space sector is of critical importance to the electronic financial system and delivering on a vast array of national needs. Satellites provide an invisible infrastructure in the daily lives of Canadians and the world. Space also provides a unique vantage point from which to observe the Earth. Currently, eleven Government of Canada departments and agencies depend on space to deliver on their mandate and priorities related to monitoring the environment and climate change; weather forecasting; safety and security; health innovation and infrastructure. Investments in space result in more high quality jobs and more innovation in Canada. In 2018–19, the CSA chose to outline the planning highlights section below along the four departmental results outlined in its Departmental Results Framework which includes space research and development advances science and technology, Canadians engage with space, space information and technology improves the lives of Canadians and Canada's investment in space benefit the Canadian economy and each one is critically important in demonstrating the impact the CSA has on the lives of Canadians.

Result 1 – Space research and development advances science and technology

Through advancements in science and technology resulting from research and development in the space sector, the CSA enables the first steps in the continuum of change that will result in benefits for Canadians.

In 2018–19, the CSA will continue the implementation of the Quantum Encryption and Science Satellite[vii] (QEYSSat) demonstration mission, which aims to demonstrate quantum key distribution technology in space. This technology will provide Canada with more secure

communications in the age of quantum computing, when traditional encryption is rendered obsolete. A Request for Proposals (RFP) will be issued to define the detailed requirements for the mission, which is scheduled to launch in 2022–23. This mission will advance considerably both the technology and scientific understanding of quantum key distribution in Canada which could result in benefits for various Government of Canada departments and agencies including the Department of National Defence, Communications Security Establishment, National Research Council , and Public Safety Canada.

In the fall of 2018, an Announcement of Opportunity (AO) for the next wave of the Space and Technology Development Program[viii] will be launched to invest $10.0M in promising space technologies. At the same time, the CSA's investment in 32 companies for a value of approximately $20.0M resulting from the 2017–18 AO will support companies in such areas as artificial cognitive systems to support medical diagnostics in long-duration spaceflights and related terrestrial applications, and the improvement of satellites' downlink capacity using optical systems.

These initiatives will stimulate Business Expenditure in Research and Development which is the first step toward advancements in science and technologies. It is expected that businesses will invest a total of $195.0M in Research and Development in 2018–19.

In support of advancing space science and technologies, the CSA will also provide Canadian scientists who are conducting world-class research with continued access to scientific data by maintaining the operation of the Canadian science mission SCISAT.[ix] SCISAT provides Canadian researchers, including researchers at Environment and Climate Change Canada, as well as international researchers, with the data required to make key observations that advance research in the fields of ozone protection and atmospheric chemistry. Data generated by this satellite has resulted in 440 SCISAT-supported publications to date, and a further 30 publications are anticipated in 2018–19, thus demonstrating the ongoing importance of this science mission.

Planetary exploration and space astronomy missions also provide unique opportunities for Canadian scientists to embark on international space missions and gain access to scientific data. The CSA will invest $2.1M to support Canadian science teams participating in NASA's Curiosity[x] rover mission, the OSIRIS-REx[xi] asteroid sample return mission, and India's ASTROSAT[xii] mission.

In addition to providing critical robotic operations on the International Space Station with Canadarm2 and Dextre,[xiii] in 2018–19 the CSA will provide opportunities for industry and academia to perform studies and technology developments that will help define options for Canada's possible participation in international human exploration initiatives beyond low Earth orbit.

Also in 2018–19, the integration and testing of the James Webb Space Telescope[xiv] spacecraft will be finalized, and the science teams will be ready to take advantage of the most powerful space telescope ever launched. After its launch, which is currently planned for mid-2019, Canadian astronomers will have opportunities to use the telescope to make new discoveries.

By providing access to high-quality scientific data and supporting researchers, the CSA will contribute to maintaining Canada's international ranking in citation index scores for space-related publications.

Result 2 – Canadians engage with space

By taking advantage of Canadians' interest in space and by providing opportunities for youth to acquire the skills to pursue studies and careers in STEM, the CSA will support the development of the next generation of space scientists and engineers.

In November 2018, CSA astronaut David Saint-Jacques[iv] will be launched aboard a Soyuz spacecraft to the ISS for a six-month mission, known as Expedition 58/59. This will be Canada's third long-duration mission, and follows on the mission of astronaut Robert Thirsk in 2009 and that of Commander Chris Hadfield in 2012–13. Long-duration astronaut missions on the ISS are high-profile and celebrated achievements that inspire and engage the Canadian public and youth while sparking engagement with the CSA. This is an opportunity for the CSA to invite young Canadians to engage in STEM activities by actively collaborating and partnering with other government departments and agencies as in the case of the Natural Sciences and Engineering Research Council of Canada's Little Inventors and Let's Talk Science which will help bring space into classrooms across Canada.

As part of the Science, Technology and Expertise Development in Academia (STEDiA) initiative, which supports colleges and universities developing space science and technology, and the expertise required for the future, the CSA will continue to work on the Canadian CubeSat Project[v] that was launched in 2017–18. Through this project, teams of professors and students across Canada will take part in a space mission. In 2018–19, the CSA will award up to 13 grants each valued between $0.2M and $0.25M (for a total of $2.9M) to post-secondary institutions that, as part of a challenge, will have up to four years to design, build, launch and operate their own satellites. The CSA's Canadian CubeSat Project seeks to support proposals from each province and territory across Canada. The STEDiA initiative will also invest $3.6M in the Flights and Fieldwork for the Advancement of Science and Technology[xv] to support space research in Canadian post-secondary institutions.

The CSA will also invest $2.3M in Solar-Terrestrial and Earth System Science and $0.5M in Science and Operational Applications Research in Earth Observation.

Through these initiatives, post-secondary students and young professionals will acquire the professional skills and the scientific and/or technical knowledge required to be in a better position to play an active role in the space sector. In 2018–19, as part of its effort to apply a Gender Based Analysis (GBA) plus approach, the CSA will review its indicators and current methodologies to better monitor its impacts on youth.

Result 3 – Space information and technologies improve the lives of Canadians

Canadians may not be aware of all the benefits generated by Canada's presence in space, from communication and Earth observation data to the potential spin-offs of technology for use on Earth. The CSA supports other government departments and agencies in the delivery of their mandates by providing access to space data, information, and services as well as encourages the commercial exploitation of space capabilities, technologies, facilities and systems that improve the lives of Canadians.

In 2018–19, the CSA will continue to provide ongoing high-quality space radar data for government services using RADARSAT-2[xvi] capabilities while preparing to launch the next-generation system, the RADARSAT Constellation Mission[iii] (RCM). When the RCM is launched in 2018–19 it will include an Automatic Identification System, which will improve Canada's space-based capabilities to detect ships and manage marine traffic. The data resulting from the RCM will contribute to an increased quality of existing services already being offered, as well as offer new services, such as land use evolution, coastal change, urban subsidence and even the impact of people on local environments. The RCM will be fully operational three months after the launch once the commissioning is complete. New tools will be provided to other government departments and agencies to automate RCM data processing. The CSA will also continue to explore how to increase wider uptake of the RADARSAT data archives, furthering the socio-economic benefits of this investment. In total, eleven federal organizations are using RADARSAT data to deliver on their mandate including: Environment and Climate Change Canada, Fisheries and Oceans Canada, the Department of National Defence, Agriculture and Agri-Food Canada, and the Public Health Agency of Canada.

Through the investment of $2.6M in 2018–19 in the Earth Observation Application Development initiative, the CSA will further support these same government departments and agencies, as well as provincial and territorial governments, academic and industry stakeholders by increasing the number and quality of services provided to Canadians. For instance, a new process using multiple sources of data resulting in maps of forest attributes across the Northwest Territories (NWT) will be provided to the Department of Environment and Natural Resources of the NWT government, which will then use this information to deliver multiple services to Canadians, such as detection of clear-cut and partial-cut harvesting; monitoring of forest regeneration following disturbances; and estimates of biomass and forest cover density.

The CSA will also continue to invest $3.7M in the joint NASA-CNES (Centre national d'études spatiales – the French space agency) Surface Water Ocean Topography[xvii] mission by providing a key component of the radar instrument which will showcase key Canadian technology internationally. This technology will enable accurate measurements of Canada's water resources, which in turn will provide the scientific community with a better understanding of the dynamics of the world's oceans and terrestrial surface water, allowing them to address important global issues like climate change and improve our management of water as a strategic resource. The SWOT data could lead to improvements in many water-related services in Canada, such as weather predictions and flood-warning systems thus benefitting Environment and Climate Change Canada and the Department of Fisheries and Oceans scientists who will have access to better data in support of their mandates.

During CSA astronaut David Saint-Jacques' time aboard the ISS, from November 2018 to May 2019, a series of scientific experiments will be conducted. The Vascular Echo[xviii] experiment will examine changes in the blood vessels and the heart while the astronauts are in space, and then follow their recovery after their return to Earth. At Home in Space[xix] will assess the culture, values, and psychosocial adaptation of astronauts to a space environment shared by multinational astronaut crews on long-duration missions as they deal with the isolated and confined environment of the spacecraft. It is expected that the knowledge acquired during these experiments will have future useful applications on Earth.

In 2018–19, the CSA will also launch two Canadian-developed technologies aboard the ISS. The first is the Bio-Monitor,[xx] a smart garment that records physiological parameters such as heart rate and temperature. The second is the Bio-Analyzer,[xxi] which will perform sophisticated analyses of physiological samples such as blood. Both technologies will be supporting human research on the ISS and are expected to find applications on Earth in areas such as health monitoring at home and in remote areas.

In 2018–19, it is expected that 7 technological spin-offs resulting from the CSA's past investments will benefit Canadians.

Result 4 – Canada's investments in space benefit the Canadian economy

By supporting innovation in the space sector, the CSA will enable Canadian innovators and entrepreneurs to take advantage of growth opportunities and create well-paying jobs. While investments in the space program generate national pride and help other government departments deliver services to Canadians, it is paramount that investments in space activities also result in economic benefits for Canadians. These benefits are the ultimate goal of the Innovation and Skills Plan,[ii] which is an ambitious effort to make Canada a world-leading centre for innovation; help create better, well-paying jobs; and help strengthen and grow the middle class.

As such, in 2018–19, through Innovation, Science, and Economic Development Canada's Innovative Solutions Canada[xxii] (ISC) initiative, the CSA will invest $0.3M in small businesses to prove the scientific and technical feasibility, and commercial potential, of a novel idea that addresses a public sector challenge. The first challenges of ISC, which were officially launched in December 2017, included the CSA's challenge for innovators to apply artificial intelligence and big data analytics to bring tangible advancements in the operation and utilization of satellites, their data and ground infrastructure in support of government operations, public safety, public health and discovery. The CSA expects that the results regarding the successful innovative solutions challenges submitted by the innovators will be available in 2018–19. The CSA will closely monitor the results of this initiative and will use it to inform decisions-making regarding the use of this innovative procurement process for future investments.

The Canada / European Space Agency (ESA) Cooperation Agreement[xxiii] is the main mechanism used to sustain Canadian space industry exports and facilitates access to the European and global markets. As a result of the additional investment of $43.0M in ESA's Advanced Research in Telecommunications Systems (ARTES) program in December 2016, it is anticipated that in 2018–19 several contracts with a high potential for future exports will be awarded to Canadian industry.

In 2018–19, the CSA will invest $1.6M in contributions to support Canadian industry in the development of novel applications and services using Earth observation space-based data and information. These innovative applications that seek to integrate data from CSA-supported missions with other massive data sources will help Canadian companies gain competitiveness by tapping into the possibilities offered by big data, cloud computing and machine-to-machine technologies. Combining CSA data such as RADARSAT-1[xxiv] and RADARSAT-2[xxvi] data with free and open satellite data (Sentinel, Envisat, Landsat), commercial satellite data, in-situ measurements and products like soil maps and weather models, furthers the impact of the CSA's investments.

These investments seek to ensure that Canadian space sector companies develop value-added services, while helping position them in the global export market, and ensuring that Canada's space sector maintains the value of exports overall.

By supporting the development, maturation, and commercialization of space technologies and services, the CSA will fully support the goals of the Innovation and Skills Plan by helping the Canadian space sector grow and create highly qualified and well-paying jobs for Canadians. As such, in 2018–19, it is expected that the space sector will generate $1.6 billion in exports and maintain 4,250 highly qualified jobs.

Planned results

Departmental Results	Departmental Result Indicators	Target	Date to achieve target	2014–15 Actual results	2015–16 Actual results	2016–17 Actual results
1: Space research and development advances science and technology	I1: Business Expenditures in Research and Development (BERD) in the space sector	$195M[1]	March 31, 2019	$180M	$146M	$256M
	I2: Canada's rank among OECD nations on the citation score of space-related publications	11	March 31, 2019	N/A New indicator	N/A New indicator	N/A New indicator
2: Canadians engage with space	I3: Number of new people and organizations entering space related fields as a result of CSA funding	Baseline year. Target will be set for 2019-20	March 31, 2019	N/A New indicator	N/A New indicator	N/A New indicator
	I4: Number of engagements on social media related to the CSA	1,000,000	March 31, 2019	N/A New indicator	N/A New indicator	2 351 059[2]

1 Target is set based on a rolling 3-year average.

2 Actual results include a significant response due to the Astronaut Recruitment Campaign activities which has now been completed. Although the CSA does expect significant engagements from David Saint-Jacques's mission to the International Space Station, possible changes to the algorithm by major internet platform-owners to address 'fake news' issues could unintentionally impact the CSA's engagement results. The target has been adjusted accordingly and results will be monitored closely throughout the year.

Departmental Results	Departmental Result Indicators	Target	Date to achieve target	2014–15 Actual results	2015–16 Actual results	2016–17 Actual results
3: Space information and technologies improve the lives of Canadians	I5: Number of services offered to Canadians dependent on CSA information (such as remote sensing data, including satellite imagery and science observations)	85	March 31, 2019	N/A New indicator	N/A New indicator	N/A New indicator
	I6: Number of Canadian space technologies adapted for use on earth or re-use in space	7	March 31, 2019	N/A New indicator	N/A New indicator	N/A New indicator
4 Canada's investments in space benefit the Canadian economy	I7: Number of highly qualified people in the Canadian space sector	4,250	March 31, 2019	4,360	4,226	4,264
	I8: Value of export of the Canadian space sector	$1.6B	March 31, 2019	$1.6B	$1.6B	$1.6B

Budgetary financial resources (dollars)

2018–19 Main Estimates	2018–19 Planned spending	2019–20 Planned spending	2020–21 Planned spending
301,093,697	301,093,697	262,303,150	223,863,572

Human resources (full-time equivalents)

2018–19 Planned full-time equivalents	2019–20 Planned full-time equivalents	2020–21 Planned full-time equivalents
390.3	386.9	386.9

Financial, human resources and performance information for the Canadian Space Agency's Program Inventory is available in the GC InfoBase.[xxv]

Internal Services

Description

Internal Services are those groups of related activities and resources that the federal government considers to be services in support of programs and/or required to meet corporate obligations of an organization. Internal Services refers to the activities and resources of the 10 distinct service categories that support Program delivery in the organization, regardless of the Internal Services delivery model in a department. The 10 service categories are: Management and Oversight Services; Communications Services; Legal Services; Human Resources Management Services; Financial Management Services; Information Management Services; Information Technology Services; Real Property Services; Materiel Services; and Acquisition Services.

Budgetary financial resources (dollars)

2018–19 Main Estimates	2018–19 Planned spending	2019–20 Planned spending	2020–21 Planned spending
47,779,400	47,779,400	48,960,408	50,054,112

Human resources (full-time equivalents)

2018–19 Planned full-time equivalents	2019–20 Planned full-time equivalents	2020–21 Planned full-time equivalents
271.2	271.2	271.2

Planning highlights

To ensure that we have a strong focus on results and that we provide clear oversight and accountability for Canada's investments in space, in 2018–19 the CSA will continue to implement its newly adopted Departmental Results Framework (DRF) and publish its annual State of the Canadian Space Sector Report. The CSA will also continue strengthening its knowledge of the Canadian space sector and the opportunities and challenges facing its growth and competitiveness by completing the ongoing assessments related to the downstream impacts of deep-space telecommunications and the socio-economic benefits of space utilization as well as standardizing the CSA's approach to calculating the return on investments in space.

As part of the initiative to improve the use of evidence and data in program innovation, as stated in the mandate letter addressed to the President of Treasury Board, and in light of the new DRF, the CSA will adjust its Five-Year Evaluation Plan. The CSA will also review its current processes and tools to ensure that evaluation results are fully integrated into decision-making and outline some of the lessons learned from these evaluations in future reporting.

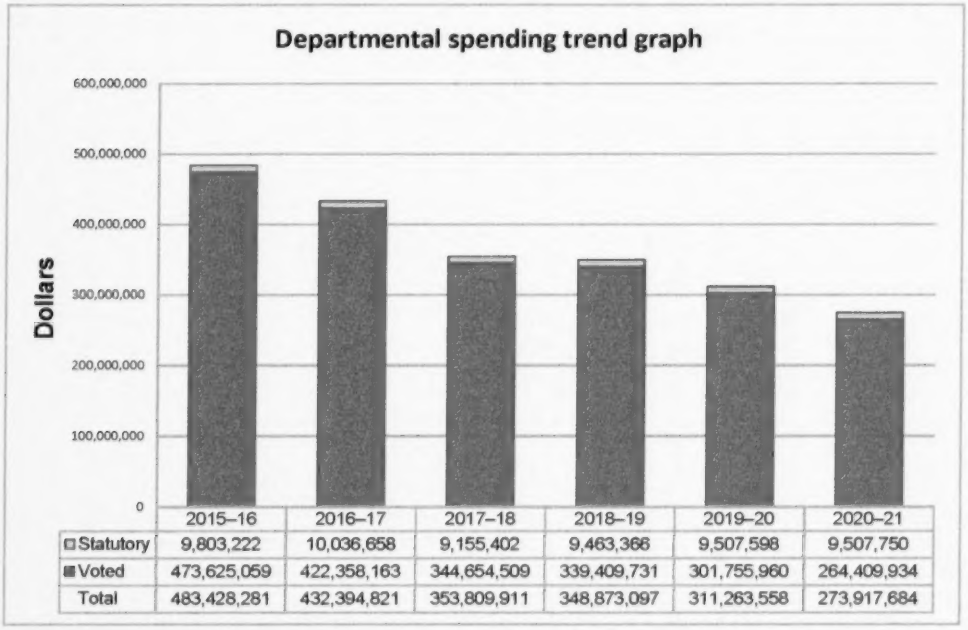
The CSA will continue to implement its People-effective Management Strategy, an integrated three-year strategy (2017–20) that focuses on ensuring healthy, inclusive and empowering work environments, and establishing a productive and skilled workforce in 2018–19. The CSA will also continue the implementation of its Brain Friendly program that promotes the health and wellness of CSA employees through awareness, prevention and educational activities.

By integrating renewal initiatives within its strategic and operational plans, the CSA will create a streamlined and efficient organization that is built on ongoing improvement, thus allowing it to meet the challenges ahead.

Spending and human resources

Planned spending

Departmental spending trend graph



	2015–16	2016–17	2017–18	2018–19	2019–20	2020–21
Statutory	9,803,222	10,036,658	9,155,402	9,463,366	9,507,598	9,507,750
Voted	473,625,059	422,358,163	344,654,509	339,409,731	301,755,960	264,409,934
Total	483,428,281	432,394,821	353,809,911	348,873,097	311,263,558	273,917,684

Budgetary planning summary for Core Responsibilities and Internal Services (dollars)

Core Responsibilities and Internal Services	2015–16 Expenditures	2016–17 Expenditures	2017–18 Forecast spending	2018–19 Main Estimates	2018–19 Planned spending	2019–20 Planned spending	2020–21 Planned spending
Canada in space	367,410,892	341,948,633	330,534,359	301,093,697	301,093,697	262,303,150	223,863,572
Subtotal	367,410,892	341,948,633	330,534,359	301,093,697	301,093,697	262,303,150	223,863,572
Internal Services	45,388,166	46,349,645	64,171,096	47,779,400	47,779,400	48,960,408	50,054,112
Total	**412,799,058**	**388,298,278**	**394,705,455**	**348,873,097**	**348,873,097**	**311,263,558**	**273,917,684**

The variance in the CSA's expenditure profile since 2015–16 is primarily due to investments related to the development of the RADARSAT Constellation Mission (RCM) announced in Budget 2010. The CSA has received additional funding from other government departments in

support of the RCM mission. More information with regard to the CSA's expenditure profile is provided in the "Departmental Spending Trend" graph above.

It should be noted that the funding profile of the CSA's projects and missions varies from year to year and therefore has an impact on the Expenditures, Forecast Spending, and Planned Spending.

Planned human resources

Human resources planning summary for Core Responsibilities and Internal Services (full-time equivalents)

Core Responsibilities and Internal Services	2015–16 Actual	2016–17 Actual	2017–18 Forecast	2018–19 Planned	2019–20 Planned	2020–21 Planned
Canada in space	344.6	361.6	384.8	390.3	386.9	386.9
Subtotal	344.6	361.6	384.8	390.3	386.9	386.9
Internal Services	246.8	252.4	267.4	271.2	271.2	271.2
Total	**591.4**	**614.0**	**652.2**	**661.5**	**658.1**	**658.1**

The progressive increase in the number of FTEs starting in 2015–16 is mainly related to the following:

- Additional personnel required to support International Space Station (ISS) activities until 2024–25; and
- Additional personnel requirements to address some gaps and priorities, which include an increased investment in students in line with attracting the new generation of public servants.

Estimates by vote

For information on the Candian Space Agency's organizational appropriations, consult the 2018–19 Main Estimates.[xxvi]

Future-Oriented Condensed Statement of Operations

The Future-Oriented Condensed Statement of Operations provides a general overview of the Canadian Space Agency's operations. The forecast of financial information on expenses and revenues is prepared on an accrual accounting basis to strengthen accountability and to improve transparency and financial management.

Because the Future-Oriented Condensed Statement of Operations is prepared on an accrual accounting basis, and the forecast and planned spending amounts presented in other sections of the Departmental Plan are prepared on an expenditure basis, amounts may differ.

A more detailed Future-Oriented Statement of Operations and associated notes, including a reconciliation of the net cost of operations to the requested authorities, are available on the Canadian Space Agency's website.[xxvii]

Future-Oriented Condensed Statement of Operations for the year ended March 31, 2019 (dollars)

Financial information	2017–18 Forecast results	2018–19 Planned results	Difference (2018–19 Planned results minus 2017–18 Forecast results)
Total expenses	364,879,859	355,337,143	(9,542,716)
Total revenues	28,834	28,834	0
Net cost of operations before government funding and transfers	364,851,025	355,305,309	(9,542,716)

Expenses

Total expenses, estimated on an accrual basis, are planned to be $355,337,143 in 2018–19 and are substantially the same level as forecasted in 2017–18 ($364,879,859), a decrease of $9,542,716 (2.6%).

Expenses are mainly related to professional and special services, amortization and salaries and fringe benefits. The expenses include planned spending presented in this Departmental Plan as well as expenses not mentioned such as amortization, services provided without charge by other government departments, and severance benefits and vacation pay liability adjustments.

Revenues

Total revenues are projected to be $1,437,898 in 2018–19. Most of the revenues are generated from the sales of goods and services and from other revenues (penalty revenues). The Agency's respendable revenues are projected to be $28,834 and represent revenues from Crown Asset Disposition.

Supplementary information

Corporate information

Organizational profile

Minister of Innovation, Science and Economic Development:
The Honourable Navdeep Bains, P.C., M.P.

Minister of Science:
The Honourable Kirsty Duncan, P.C., M.P.

Minister of Small Business and Tourism and Leader of the Government in the House of Commons:
The Honourable Bardish Chagger, P.C., M.P.

Institutional Head:
Sylvain Laporte, President

Ministerial Portfolio:
Innovation, Science and Economic Development

Enabling Instrument(s):
Canadian Space Agency Act, S.C. 1990, c. 13[xxviii]

Year of Incorporation / Commencement:
Established in March 1989

Other:
The Canadian Space Agency was established in 1989. Approximately 84% of its employees work at the headquarters located at the John H. Chapman Space Centre, in St-Hubert, Quebec. The remaining personnel serve the CSA at the David Florida Laboratory in Ottawa, Ontario and its Policy and planning offices in Gatineau, Quebec, with officials in Houston, Washington and Paris.

Raison d'être, mandate and role

"Raison d'être, mandate and role: who we are and what we do" is available on the Canadian Space Agency's website.[xxvii]

Operating context and key risks

Information on operating context and key risks is available on the Canadian Space Agency's website.[xxvii]

Reporting framework

The Canadian Space Agency Departmental Results Framework and Program Inventory of record for 2018–19 are shown below:

Departmental Results Framework	Core Responsibility: Canada in space		Internal Services
	Departmental Result: Space research and development advances science and technology	Indicator: Business Expenditures in Research and Development in the space sector	
		Indicator: Canada's rank among OECD nations on the citation score of space-related publications	
	Departmental Result: Canadians engage with space	Indicator: Number of new people and organizations entering space related fields as a result of CSA funding	
		Indicator: Number of engagements on social media related to the CSA	
	Departmental Result: Space information and technologies improve the lives of Canadians	Indicator: Number of services offered to Canadians dependent on CSA information	
		Indicator: Number of Canadian space technologies adapted for use on earth or re-use in space	
	Departmental Result: Canada's investments in space benefit the Canadian economy	Indicator: Number of highly qualified people in the Canadian space sector	
		Indicator: Value of export of the Canadian space sector	
Program Inventory	Program: Space Capacity Development		
	Program: Space Exploration		
	Program: Space Utilization		

Concordance between Departmental Results Framework and Program Inventory, 2018–19, and Strategic Outcomes and Program Alignment Architecture, 2017–18

2018–19 Departmental Results Framework and Program Inventory of record	2017–18 Strategic Outcomes and Program Alignment Architecture of record	Percentage of Program Alignment Architecture program (dollars) corresponding to new program in the Program Inventory
1. Canada in space	1. Canada's exploration of space, provision of space services and development of its space capacity meet the nation's needs for scientific knowledge, innovation and information.	100%
Space Capacity Development	1.1.3.1 Earth Observation Data and Imagery Utilization	11%
	1.3.1 Space Expertise and Proficiency	100%
	1.3.2.1 International Market Access	100%
	1.3.2.2 Enabling Technology Development	100%
	1.3.3 Qualifying and Testing Services	100%
Space Exploration	1.2.1.1 International Space Station Assembly and Maintenance Operations	100%
	1.2.1.2 International Space Station Utilization	100%
	1.2.2.1 Space Astronomy Missions	100%
	1.2.2.2 Planetary Missions	100%
	1.2.2.3 Advanced Exploration Technology Development	100%
	1.2.3.1 Astronaut Training and Missions	100%
	1.2.3.2 Operational Space Medicine	100%
	1.2.3.3 Health and Life Sciences	100%

2018–19 Departmental Results Framework and Program Inventory of record	2017–18 Strategic Outcomes and Program Alignment Architecture of record	Percentage of Program Alignment Architecture program (dollars) corresponding to new program in the Program Inventory
Space Utilization	1.1.1.1 Earth Observation Missions	100%
	1.1.1.2 Communications Missions	100%
	1.1.1.3 Scientific Missions	100%
	1.1.2.1 Satellite Operations	100%
	1.1.2.2 Data Handling	100%
	1.1.3.1 Earth Observation Data and Imagery Utilization	89%
	1.1.3.2 Communications Services Missions	100%
	1.1.3.3 Scientific Data Utilization	100%
Internal Services	Internal Services	100%

Supporting information on the Program Inventory

Supporting information on planned expenditures, human resources, and results related to the Canadian Space Agency's Program Inventory is available in the GC InfoBase.[xxix]

Supplementary information tables

The following supplementary information tables are available on the Canadian Space Agency's website.[xxvii]

- Departmental Sustainable Development Strategy
- Details on transfer payment programs of $5 million or more
- Gender-Based Analysis plus
- Planned evaluation coverage over the next five fiscal years
- Status report on transformational and major Crown projects
- Upcoming internal audits for the coming fiscal year

Federal tax expenditures

The tax system can be used to achieve public policy objectives through the application of special measures such as low tax rates, exemptions, deductions, deferrals and credits. The Department of Finance Canada publishes cost estimates and projections for these measures each year in the Report on Federal Tax Expenditures.[xxx] This report also provides detailed background information on tax expenditures, including descriptions, objectives, historical information and references to related federal spending programs. The tax measures presented in this report are the responsibility of the Minister of Finance.

Organizational contact information

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Appendix: definitions

appropriation (crédit)

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

budgetary expenditures (dépenses budgétaires)

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

Core Responsibility (responsabilité essentielle)

An enduring function or role performed by a department. The intentions of the department with respect to a Core Responsibility are reflected in one or more related Departmental Results that the department seeks to contribute to or influence.

Departmental Plan (plan ministériel)

A report on the plans and expected performance of appropriated departments over a three-year period. Departmental Plans are tabled in Parliament each spring.

Departmental Result (résultat ministériel)

Any change or changes that the department seeks to influence. A Departmental Result is often outside departments' immediate control, but it should be influenced by Program-level outcomes.

Departmental Result Indicator (indicateur de résultat ministériel)

A factor or variable that provides a valid and reliable means to measure or describe progress on a Departmental Result.

Departmental Results Framework (cadre ministériel des résultats)

The department's Core Responsibilities, Departmental Results and Departmental Result Indicators.

Departmental Results Report (rapport sur les résultats ministériels)

A report on the actual accomplishments against the plans, priorities and expected results set out in the corresponding Departmental Plan.

experimentation (expérimentation)

Activities that seek to explore, test and compare the effects and impacts of policies, interventions and approaches, to inform evidence-based decision-making, by learning what works and what does not.

full-time equivalent (équivalent temps plein)

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. Full-time equivalents are calculated as a ratio of assigned hours of work to scheduled hours of work. Scheduled hours of work are set out in collective agreements.

gender-based analysis plus (GBA+) (analyse comparative entre les sexes plus [ACS+])

An analytical process used to help identify the potential impacts of policies, Programs and services on diverse groups of women, men and gender-diverse people. The "plus" acknowledges that GBA goes beyond sex and gender differences to consider multiple identity factors that intersect to make people who they are (such as race, ethnicity, religion, age, and mental or physical disability).

government-wide priorities (priorités pangouvernementales)

For the purpose of the 2018–19 Departmental Plan, government-wide priorities refers to those high-level themes outlining the government's agenda in the 2015 Speech from the Throne, namely: Growth for the Middle Class; Open and Transparent Government; A Clean Environment and a Strong Economy; Diversity is Canada's Strength; and Security and Opportunity.

horizontal initiative (initiative horizontale)

An initiative in which two or more federal organizations, through an approved funding agreement, work toward achieving clearly defined shared outcomes, and which has been designated (by Cabinet, a central agency, etc.) as a horizontal initiative for managing and reporting purposes.

non-budgetary expenditures (dépenses non budgétaires)

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

performance (rendement)

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

performance indicator (indicateur de rendement)

A qualitative or quantitative means of measuring an output or outcome, with the intention of gauging the performance of an organization, program, policy or initiative respecting expected results.

performance reporting (production de rapports sur le rendement)

The process of communicating evidence-based performance information. Performance reporting supports decision making, accountability and transparency.

planned spending (dépenses prévues)

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in the Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

plan (plan)

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead up to the expected result.

priority (priorité)

A plan or project that an organization has chosen to focus and report on during the planning period. Priorities represent the things that are most important or what must be done first to support the achievement of the desired Departmental Results.

Program (programme)

Individual or groups of services, activities or combinations thereof that are managed together within the department and focus on a specific set of outputs, outcomes or service levels.

Program Alignment Architecture (architecture d'alignement des programmes)[3]

A structured inventory of an organization's programs depicting the hierarchical relationship between programs and the Strategic Outcome(s) to which they contribute.

result (résultat)

An external consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead they are within the area of the organization's influence.

3. Under the Policy on Results, the Program Alignment Architecture has been replaced by the Program Inventory.

statutory expenditures (dépenses législatives)

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

Strategic Outcome (résultat stratégique)

A long-term and enduring benefit to Canadians that is linked to the organization's mandate, vision and core functions.

sunset program (programme temporisé)

A time-limited program that does not have an ongoing funding and policy authority. When the program is set to expire, a decision must be made whether to continue the program. In the case of a renewal, the decision specifies the scope, funding level and duration.

target (cible)

A measurable performance or success level that an organization, Program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

voted expenditures (dépenses votées)

Expenditures that Parliament approves annually through an Appropriation Act. The Vote wording becomes the governing conditions under which these expenditures may be made.

Endnotes

i **ISED minister mandate letter**, https://pm.gc.ca/eng/minister-innovation-science-and-economic-development-mandate-letter

ii **Innovation and Skills Plan**, http://www.ic.gc.ca/eic/site/062.nsf/eng/home

iii **RADARSAT Constellation**, http://www.asc-csa.gc.ca/eng/satellites/radarsat/default.asp

iv **David Saint-Jacques's Mission**, http://www.asc-csa.gc.ca/eng/missions/expedition58-59/default.asp

v **Canadian CubeSat Project**, http://www.asc-csa.gc.ca/eng/sciences/canadian-cubesat-project.asp

vi **Blueprint 2020**, https://www.canada.ca/en/privy-council/topics/blueprint-2020-public-service-renewal.html

vii **QEYSSat**, http://www.asc-csa.gc.ca/eng/sciences/qeyssat.asp

viii **STDP**, http://www.asc-csa.gc.ca/eng/programs/stdp/Default.asp

ix **SCISAT**, http://www.asc-csa.gc.ca/eng/satellites/scisat/default.asp

x **Curiosity**, http://www.asc-csa.gc.ca/eng/astronomy/mars/curiosity.asp

xi **OSIRIS-Rex**, http://www.asc-csa.gc.ca/eng/satellites/osiris-rex/default.asp

xii **ASTROSAT**, http://www.asc-csa.gc.ca/eng/sciences/astrosat.asp

xiii **Mobile Servicing System**, http://www.asc-csa.gc.ca/eng/iss/mobile-basc/overview.asp

xiv **JWST**, http://www.asc-csa.gc.ca/eng/satellites/jwst/default.asp

xv **FAST**, http://www.asc-csa.gc.ca/eng/ao/2017-fast.asp

xvi **RADARSAT-2**, http://www.asc-csa.gc.ca/eng/satellites/radarsat2/default.asp

xvii **SWOT**, http://www.asc-csa.gc.ca/eng/satellites/swot.asp

xviii **Vascular Echo**, http://www.asc-csa.gc.ca/eng/sciences/vascular.asp

xix **At Home in space**, http://www.asc-csa.gc.ca/eng/sciences/at-home-in-space.asp

xx **Bio-Monitor**, http://www.asc-csa.gc.ca/eng/sciences/bio-monitor.asp

xxi **Bio-Analyzer**, http://www.asc-csa.gc.ca/eng/iss/bio-analyzer.asp

xxii **Innovative Solutions Canada**, http://www.ic.gc.ca/eic/site/101.nsf/eng/home

xxiii **Canada-ESA cooperation agreement**, http://www.asc-csa.gc.ca/eng/programs/esa/default.asp

xxiv **RADARSAT-1**, http://www.asc-csa.gc.ca/eng/satellites/radarsat1/Default.asp

xxv **GC InfoBase**, https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

xxvi **2017–18 Main Estimates**, https://www.canada.ca/en/treasury-board-secretariat/services/planned-government-spending/government-expenditure-plan-main-estimates.html

xxvii **Reports to Parliament**, http://www.asc-csa.gc.ca/eng/publications/rp.asp

xxviii **Canadian Space Agency Act**, http://laws.justice.gc.ca/eng/acts/C-23.2/page-1.html

xxix **GC InfoBase**, https://www.tbs-sct.gc.ca/ems-sgd/edb-bdd/index-eng.html#start

xxx **Report on Federal Tax Expenditures**, http://www.fin.gc.ca/purl/taxexp-eng.asp

xxxi **Canadian Space Agency**, http://asc-csa.gc.ca